COASTAL SALINITY PREVENTION CELL

Kharash Vistarotthan Yojana

ANNUAL PROGRESS REPORT

CSPC promotes crop diversification and innovative farming practices for better climate adaptive measures. Net House is being promoted among medium and small land holding farmers for high value vegetable crops.

ANNUAL PROGRESS REPORT
2012 - 2014

Chairman's Message

Coastal Salinity Prevention Cell (CSPC) works with 14 NGO partners to improve the quality of lives of rural communities in coastal regions of Gujarat. The year 2014 has seen CSPC consolidate its work and explore new approaches.

At the national level there were 2 major changes which positively impacted the work of CSPC. The first was the enactment of the CSR bill which mandated corporates to spend a percentage of the net profits for Corporate Social Responsibility (CSR) and the second was the high emphasis given to sanitation by the Government through the Swach Bharat Abhiyan program. Because of the CSR act, many corporates working in coastal areas enhanced their investments in these rural areas. In sanitation, CSPC and its NGO partners have provided more than 15,000 households with individual toilets with support from from the Government. For provision of safe, non-saline drinking water, CSPC initially piloted low cost, roof rain water harvesting for the poorest households and then scaled it up with Government support. Its partnership with WASMO has continued with the phase 2 of the Coastal Area Development Programme(CADP).

Coastal areas are affected by the vagaries of climate change with the region receiving erratic and untimely rains which affects agriculture. CSPC's agriculture efforts were two-fold: kitchen gardens for increasing incomes and nutrition for marginal farmers, and efforts to reduce water and pesticide consumption in major crops like groundnut, wheat and cotton. New varieties of wheat like KRL-210 were found to be very suitable by farmers and were taken up on a large scale. Promotion of bio-pesticides and Pheromen traps found wide acceptance amongst farmers. CSPC also worked towards the promotion of micro-irrigation by supporting local entrepreneurs. Agriculture extension has expanded through the promotion of 5 producer companies and many of them became viable through the marketing of groundnut and cotton.

The recent NSSO survey showed that agriculture is now the primary source of income for only 66% of rural people in Gujarat. Coastal areas have many industries, but the employment of local people has been considerably less. Those who are hired by industries comprise mainly of unskilled labour because of inadequately trained local youth. To address the growing need amongst rural youth for non-farm jobs and enterprises, CSPC plans to support its NGO partners for skill development and education.

CSPC thanks its various partners and the Government for the unstinting support provided in 2014, and looks forward to greater efforts in 2015.

Mr. Apoorva Oza

Governance

Members Of Governing Board

Mr. Apoorva Oza	Chairman
Mr. Arun Pandhi	Member
Mr. Alok Krishna	Member
Mr. Chandrakant Kumbhani	Member
Dr. Indira Hirway	Member
Prof. Sukhpal Singh	Member
Mr. Divyang Waghela	Member Secretary

CSPC Team

The CSPC has team of experienced professionals in the field of water engineering, agriculture, management, communication, etc.

Arvind Parmar
Programme Manager – Drinking Water and Sanitation

Bhupendra Jani
Programme Officer – Natural Resource Management

Devshree Purohit
Programme Manager – Agriculture

Dhaval Shah
Programme Officer - Finance & Accounts

Divyang Waghela
Chief General Manager

Rishiraj Purohit
Programme Associate – Drinking Water and Sanitation

Paromita Sarkar*
Programme Associate – Grant Management
**Currently not associated with the organisation*

Internal Auditors

Talati & Talati Associates,
Ambica Chambers,
Near Old High Court,
Ahmedabad

Statutory Auditors

BJS & Associates

Partners

Implementing Partners

Aga Khan Rural Support Programme (AKRSP) (India)

Aga Khan Planning and Building Services (AKPBS) (India)

Ambuja Cement Foundation (ACF)

Gram Vikas Trust (GVT)

Federation of Ecology Security (FES)

Mahiti – A Centre for Rural Development

Shree Vivekanand Research & Training Institute (VRTI)-Bhavnagar & Kutch

Late J V Nariya Education and Charitable Trust

Tata Chemicals Society for Rural Development (TCSRD)

GHCL Foundation Trust

AATAPI Foundation

VIKAS Centre for Development (VIKAS)

Shikshan ane Samaj Kalyan Kendra (SSKK)

Saurashtra Voluntary Actions (SAVA)

Knowledge Partners

Central Soil Salinity Research Institute (CSSRI)

Junagadh Agriculture University (JAU)

Krishi Vigyan Kendra (KVK) -Junagadh, Bharuch, Bhavnagar and Amreli

Arid Communities and Technologies (ACT)

BMTS Consultants India Private Limited

Funding Partners

Bill & Melinda Gates Foundation (BMGF) through Collectives for Integrated Livelihood Initiatives (CInI)

Conrad N Hilton Foundation

Gujarat Ecology Commission (GEC)

District Rural Development Agencies (DRDA)-Ahmedabad, Amreli, Jamnagar, Junagadh & Porbandar

Salinity Ingress Prevention Circle (SIPC)

Sir Ratan Tata Trust (SRTT)

Navajbai Ratan Tata Trust (NRTT)

Water and Sanitation Management Organization (WASMO), Government of Gujarat

INDEX

01
The Background

Climate change impacts water resources, coastal areas and ecosystems on land and ocean. The impacts of climate change on the hydrological cycle, and notably the availability of freshwater resources, have been observed in all continents and islands.

Warming of the oceans is a direct effect of climate change and has contributed to observed range shifts in vegetated coastal habitats such as coastal wetlands, mangrove forests and seagrass meadows.

Increases in saltwater intrusion and flooding have been observed in low-lying agricultural areas of deltaic regions and small islands. Total damages from coastal flooding have increased globally over the last decades.

Salinity is a global phenomenon affecting the environment as well as livelihoods of the populace dependent on nature, making it a complex issue. Only in recent years has the seriousness of this problem become widely known. The problem is massive, difficult to comprehend and even harder to stop.

Climate Change - A serious issue in coastal areas of Gujarat, India

India has a coastline of 7500 km, including two groups of islands in the Indian ocean. Gujarat has the longest coastline of 1,666 km in the country. Until the 1960s the entire Gujarat coast had a sweet water regime. However, this situation has rapidly changed over the decades. A process of rapid sea water ingress has been observed along the coastal belt. Due to the imbalance caused by over extraction of ground water, salinity has increased rapidly along the coast.

Estimates show that salinity ingress and water logging in low-lying regions increases by 0.5 km per year in coastal areas of Gujarat.

Over a period of time, the magnitude and intensity of the problem has been increasing due to over exploitation of groundwater, encouraged by agricultural and industrial growth.

Gujarat has 12% saline land as against the global average of 7%.

Increasingly salinity of land and water resources in coastal areas is a serious environmental problem in Gujarat.

The variation in coastal erosion from lowest to highest occurs within a range of 732.8 km along the coastline, which is approximately 45.8% of the entire coastline in Gujarat.

Effects of seawater ingression

- Rapid seawater ingress has adversely affected groundwater aquifers making it unfit for human consumption.
- Lack of sanitation facilities due to paucity of water linked to personal hygiene and health issues.
- Due to the very poor quality of water in some areas, women have to walk more than 3 km. to fetch potable drinking water.
- Direct impacts on human health - kidney stone and skin diseases are highly prevalent due to poor water quality or unavailability of water, leading to high health mitigation costs of Rs.10,000 per year/ per household.
- Agricultural crop losses, decreased soil fertility and soil productivity fuelled by the over exploitation of groundwater.
- High level of out-migration due to limited opportunities for alternate livelihoods. 30- 40% families have migrated in fully saline villages.

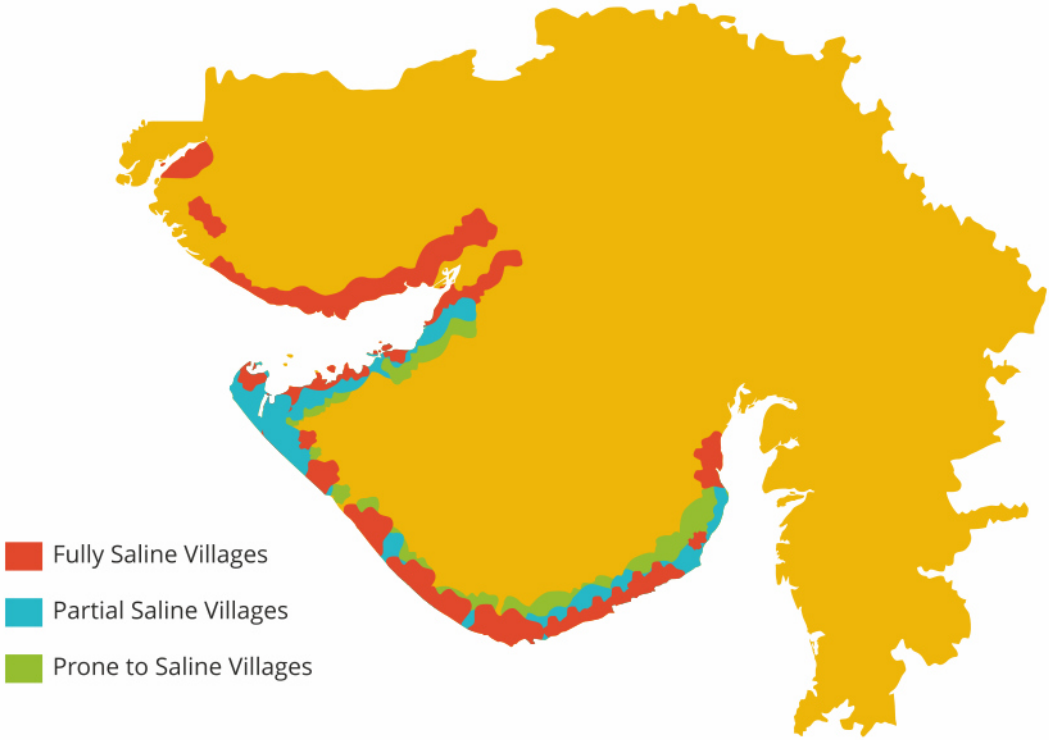
Evidences

Fishermen at Danti, 12 kms from the famous Dandi in Valsad district have been compelled to abandon their homes due to rapid sea invasion. (Frontline article 'Gone with the waves')

Seawater has shifted in by 10-15 metres in 10 years, and at places it has moved around 80 metres. (Geologists of M.S. University, Vadodara studied the Gujarat coastline, as part of an all India study made by ISRO)

From the above facts, it was evident that the coastal area in Gujarat, specifically the Saurashtra coastal belt is undergoing severe climate change effects leading to considerable salinity related issues among people living along the coastal belt.

District	Coastal Villages	Number of villages		
		Partially Saline	Fully Saline	Prone to Saline
Amreli	92	23	22	47
Bhavnagar	198	35	50	113
Jamnagar	250	49	127	74
Junagadh	302	53	92	157
Porbandar	65	17	41	7
Rajkot	47	0	47	0
Kutchh	246	0	246	0
Total	1200	177	625	398



Genesis of CSPC

Aga Khan Rural Support Programme (India), Ambuja Cement Foundation and Sir Ratan Tata Trust joined hands in 2002 to tackle the salinity-led environmental crisis through formation of the Kharash Visatarotthan Yojana (KVY) initiative based on a multi sectoral response.

In recognition of the complexity and the multi-faceted nature of the problems, it was felt that to make a substantial impact, joint efforts of both – Government and civil society organisations were required.

Formation of Costal Salinity Prevention Cell (CSPC) aimed to coordinate and provide technical inputs to ongoing salinity projects in the state as well as develop innovative programmes and initiatives.

The Water Resource Department, Government of Gujarat issued a circular on April 12, 2004, which laid the foundation for the constitution of the State Level (SLSC) - as a collabrative effort of Go-NGO to address issue of salinity ingression in the state. CSPC is the convener of SLSC. On April 17, 2008 CSPC registered itself as a company, under the Section 25 of the Companies Act 1956. CSPC has a diverse board, which represents the multiplicity of the stakeholders involved.

Vision

Evolve sustainable approaches for prevention and mitigation of salinity ingress, whilst enhancing livelihood resilience of communities affected by salinity in coastal villages of Gujarat.

Philosophy

The overall philosophy of CSPC is to promote greater interaction and learning between practitioners, researchers and policy makers so that the unique problem of coastal salinity is understood, solutions implemented and policies and programs modified or formulated to scale up solutions.

Aims

- Develop a scientific integrated natural resource management model to prevent salinity ingression.
- Enhance incomes of households through agricultural and allied activities and market linkages.
- Improve drinking water and sanitation services of coastal villages of Gujarat.
- Develop and strengthen community institutions to ensure sustainability of interventions.

Strategy

a) Coping with Salinity

- Managing drinking water quality through technological solutions
- Promotion of saline resistant and low-water intensive crops and fodder
- Promoting alternative livelihood through mariculture & non-farm livelihoods; especially to small and marginal farmers

b) Preventing further salinity ingress

- Rain water harvesting and Groundwater recharge with strong technical backstopping support
- Advocacy and partnership building with the Government
- Promoting water-use efficiency measures
- Awareness & behavioural change through community institutions

Key functions of CSPC

Being the knowledge bank for coastal salinity

As a knowledge centre on salinity, it is essential to develop a detailed database; new research ideas and innovative concepts for field-level piloting; gather and document various processes and learnings generated from ongoing field projects; compile research studies and other resource material. To focus on the issue more seriously, adopt an integrated approach and find appropriate solution; working as knowledge bank on issues related to salinity forms the core function of CSPC.

Networking and developing linkages with government and other agencies; facilitating innovations and their up scaling

To tackle the salinity issue with a holistic approach, the collective efforts of the government, civil society organizations and experts need to simultaneously pooled in at macro as well as micro levels. These efforts should then lead to the formulation of an appropriate policy for salinity control and prevention, at the state and national levels. CSPC plays a pivotal role in developing a network with civil society organizations, the government, experts and the community; ensuring that they all work on the same wavelength and in the same direction.

Piloting area - specific innovations and community approaches for addressing salinity related issues

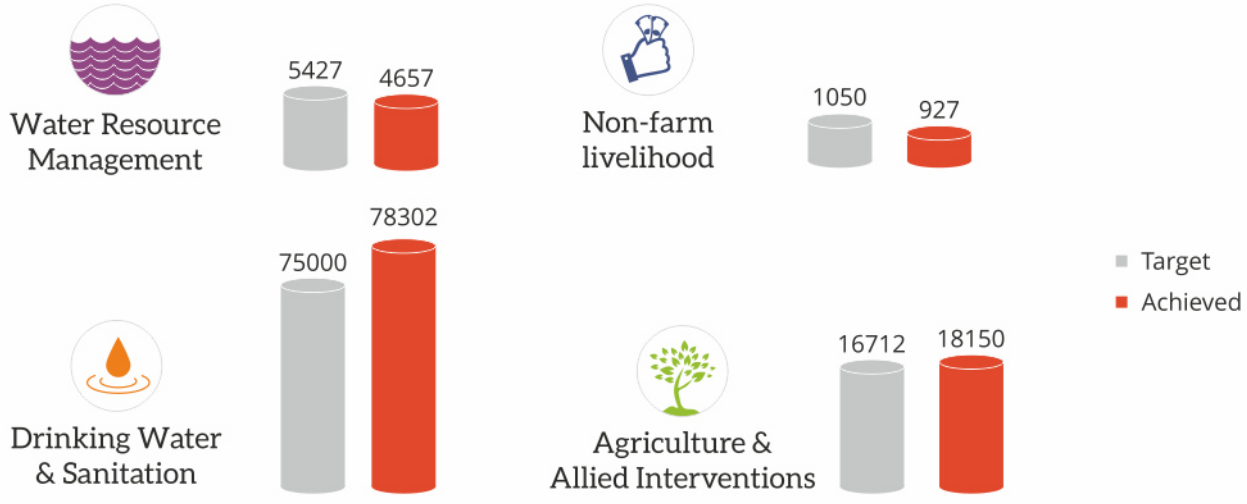
CSPC along with its local partners has ideated area-specific pilots to strengthen and sustain the livelihoods of coastal communities. Unique community approaches are adopted for better involvement, implementation and sustainability. As community forms the nucleus of any development action, their participation and sustenance is ensured in all the initiatives promoted and supported by CSPC.

Geographical Reach

CSPC works in the coastal areas of Gujarat and reaches out to more than

5,50,000 individuals and **1,02,036** households living in **410** villages, across **11** districts of Gujarat.

Outreach (2008 to 2014)



Working with institutions

17 Partner Organizations

388 Water and Sanitation Committee

238 Farmers Groups

250 Women Groups

2 Regional Federation

Thematic Areas of Intervention

- **Drinking Water and Sanitation**

  Consumption of saline drinking water, improper disposal of solid and liquid waste and lack of personal hygiene has been the major cause of diseases in rural areas. This needs to be addressed collectively through a well designed strategy. Hence, new solutions, technological as well as institutional, are important for solving the problems in a sustainable, socially acceptable as well as cost-effective manner. CSPC has taken up initiatives of enhanced community-based decentralized water storage and supply systems, identification of local intervention for enhancing alternative ground water resources, exploring possibilities of piloting non-conventional sources of energy for powering water supply systems and improved sanitation measures at the individual as well as village level.

- **Natural Resource Management**

  Water Resource Development proves to be an alternative solution to salinity management as it helps in water harvesting and recharging. CSPC has helped evolve low cost community-based solutions of water harvesting and recharging including construction of check dams, farm ponds, well ceiling, farm bunds, well renovation, percolation wells and tanks, bore well recharge, check dam repairing and deepening, pond deepening and repairing and so on.

- **Agriculture**

  It is imperative to offer alternate solutions to declining agriculture in the coastal belt than to explore new means of livelihood. Agriculture and horticulture interventions like promotion of salinity tolerant crops, horticulture crops, demonstration of vegetable plots, less water intensive crops have been taken up by CSPC. This has resulted in promoting sustainable farming practices with a focus on salinity management.

- **Education and Skill Building**

  Education: For the underprivileged children or those from the lower socio economic strata of the society, accessibility to 'quality education' at school level holds the key towards providing direction and shaping their lives for a 'good future'. Thus imparting quality education at the respective primary school equips the children with requisite capacities at the foundational level.

  CSPC has designs for working for providing elementary education and early childhood care (including nutrition enhancement) and making a difference by working in selected geographical locations of Gujarat and scaling. Formal education at primary schools could be intertwined with life skills. CSPC has started working in this direction towards providing improved education to the children.

Skill Building: Coastal regions are increasingly being identified as “engines of growth”. Coastal regions are attractive for carrying out a large number of economic activities such as tourism, mining & quarrying, salt manufacturing, petroleum and chemical industries, port led development, ship building & ship breaking, export based manufacturing units etc. The setting up of these new industries has resulted in demand for skilled and semi-skilled labour both in the formal as well as informal employment sectors. There exists scope and opportunity to tap into these demands and build up the skill and human capital base of the local youths in the coastal villages and explore possibilities of engaging them with the industrial units. Specific sectors will need to be identified and appropriate skill up gradation programme organized to cater to the demands of the market.

02

Integrated Drinking Water, Sanitation and Hygiene (WASH) Intervention

Integrated Drinking Water, Sanitation and Hygiene (WASH)

Background

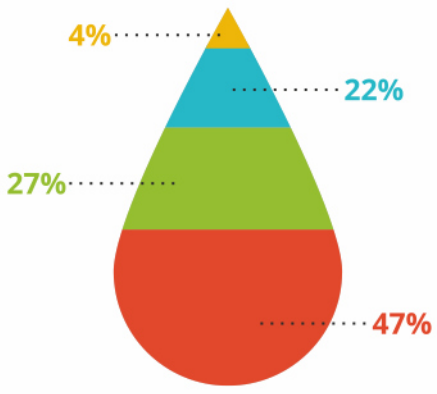
Imbalance between the ecology and economy in coastal regions has created serious problems for the life and livelihood of coastal population. One of these problems is ingress of salinity into land and water resources on the coast. A major consequence of this problem is the acute shortage of potable drinking water in this region. Keeping in mind the issues of the region, it is concluded that the coastal region needs a special strategy and attention as far as drinking water is concerned. Sanitation or the lack of it is also a vital issue. A direct relationship exists between water, sanitation, health, nutrition and human wellbeing.

India still faces the most daunting challenge wherein around 65 percent of the total rural population remains devoid of access to basic sanitation facilities. Practice of safe sanitation is a crucial indicator for quantifying improvement in standards of living. It has now been realized that the standard alternatives and solutions have not helped in overcoming water and sanitation related difficulties in coastal villages. Hence, new solutions – technological as well as institutional - need to be thought of for solving the problems in a sustainable, socially acceptable as well as cost effective manner.

Key Issues

- Poor quality of water with high level of Total Dissolved Solids (TDS) and Fluoride levels
- Many villages under 'no source' category
- Seasonal water scarcity
- Pressure on common property resources due to increasing population density and excess use in agriculture

Types of drinking water problems



Inadequate water quality
No source
Water quality problem
More than one problem

The CSPC; in partnership with Water and Sanitation Management Organisation (WASMO, Government of Gujarat has designed a special initiative namely Coastal Areas Development Project (CADP) which aims to provide safe drinking water and improved sanitation services in an integrated manner.

With a view to enhance the project interventions to achieve overall improvement of water, sanitation and hygiene status in the region; international donor agencies namely Conrad N Hilton Foundation (CNHF), Bill and Melinda Gates Foundation have extended their support to the programme. The Public Private Partnership (PPP) model bringing together Government, Non-Government and Corporate Funding Institutions is thus established to address the issues of rural community in coastal areas of Gujarat. More importantly, the rural communities are at centre focal point of the project implementation who is one of the important stakeholders of this initiative.

This novel model would also set an example of creating synergy and building partnerships between the government, national and international funding agencies, civil society organization and the rural community to attain a common objective of bringing efforts and resources together to have manifold impact.

Project Objectives

- Provide for seasonal security and conservation of water resources with an integrated combination of pipe water supply and local, traditional water resources;
- Provide for a more hygienic household and community environment with sanitation improvement by achieving Open Defecation Free (ODF) and increased hygiene awareness amongst the communities;
- Community managed decentralized implementation of water supply and sanitation improvements with facilitating inputs for community capacity building and empowerment;
- Demonstrate the benefits and rational use of multiple source water supply using technological options and integrated community managed solutions;
- Develop Community-based water utilization monitoring system to assure equitable water to all villages (with special focus on tail-end villages)
- Promoting Participatory Ground Water and Aquifer Management (PGWM) models to ensure water budgeting at community level and protecting local drinking water sources
- Provide institutional facilitating support for the community level groups through the independent implementing support agencies;

Approach

- Two-pronged strategy:

  (a) Provide community level systems which can ensure that safe drinking water is available for large part of the rural communities; and

  (b) Provide effective low-cost technologies for household water treatment which can ensure safe water at the point of consumption
- Empower local stakeholders to improve governance in managing WASH services within village
- Focus on innovative space (technology and approach) on the programme activity like designs of low-cost toilet, Roof-top Rain Water Harvesting Structure, Information Education Communication (IEC) and Behavioral Change Communication
- CSPC plays role of facilitator to bring all stakeholders on common platform to achieve common objective

Coastla Salinity Prevention Cell (a nodal agency)

Government (WASMO & Rural Development Department)

Implementation Support Organisations

Rural Communities

Outreach

Drinking water

The CSPC; in partnership with Government of Gujarat have implemented integrated WASH programme in more than 580 villages across 10 coastal districts. The Phase-I of the CADP has been completed in April-2013. Based on learnings of the Phase-I, the CSPC and WASMO has developed Phase-II of the project covering additional 280 villages and 80,000 Households; which has been initiated from September 2013.

District	Block	Nos. of villages (Phase-I)	Nos. of villages (Phase-II)	Total
Ahmedabad	Dhadhuka	30	0	30
Anand	Khambhat	10	0	10
Amreli	Rajula & Jafrabad	28	30	58
Bhavnagar	Mahuva & Talaja	30	45	75
Bharuch	Vagra	10	0	10
Jamnagar	Jamnagar, Kalyanpur & Okhamandal	50	45	95
Junagadh	Mangrol, Maliya, Veraval, Una, Kodinar & Sutrapada	60	90	150
Kutch	Mandvi, Abdasa & Lakhpat	0	60	60
Porbandar	Porbandar	12	10	22
Rajkot	Maliya	8	0	8
	TOTAL	**238**	**280**	**518**

Sanitation

Sanitation in India continue to be inadequate, despite longstanding efforts by the various levels of government and communities at improving coverage. Of the 2.5 Billion people in the world that defecate openly, some 665 million live in India. This is of greater concern as 88% of deaths from diarrhoea occur because of unsafe water, inadequate sanitation and poor hygiene.

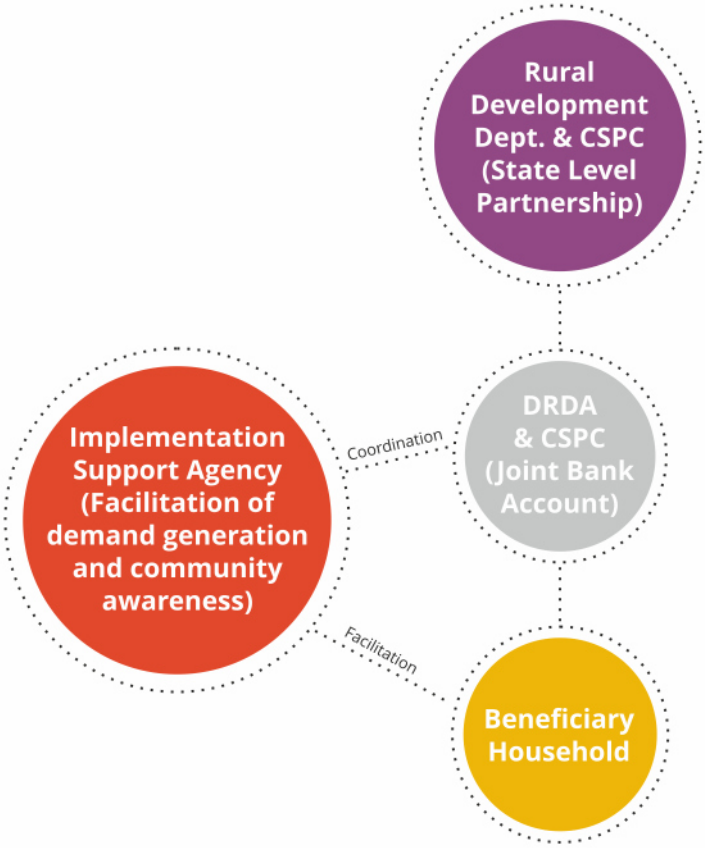
Sanitation and water goes hand in hand and need an integrated approach to improve overall standard of living of the communities. CADP is a comprehensive project for ensuring both drinking water security and safe sanitation. Sanitation is an essential component of overall livelihood of the rural communities. As a part of project implementation strategy, it was planned to generate awareness amongst the communities regarding importance of safe sanitary practices, sanitation problems and its deficiencies and encourage them to construct toilets and to use it. In this regard, the project aimed at an integrated approach and provided improved sanitation services to more than 17,500 families covering in 200 villages in coastal Gujarat.

Sr. No.	District	Nos. of HH provided with improved sanitation services (Cumulative Up to March, 2014)
1	Ahmedabad	2,088
2	Anand	403
3	Amreli	3,074
4	Bharuch	145
5	Bhavnagar	1,503
6	Kutch	255
7	Jamnagar	3,452
8	Junagadh	5,826
9	Porbandar	565
10	Rajkot	249
	Total	**17,560**

CSPC developed unique operational structure in partnership with the Government and transferred direct subsidy to beneficiary bank account.

One of the major break-through CSPC could achieve for institutional restructuring was through elimination of multi-layer process of providing incentive support directly to beneficiary. The following chart reflects the changes in the systems which has helped in expediting the implementation process at village level.

Chart : Non-conventional system under CADP



Benefits of non-conventional system established by CSPC in partnership with DRDA:

- Enhanced support directly at household level: Reinstating faith among communities on the delivery mechanism
- Reducing processing time of fund flow to around 20-30 days and improving transparency: So far, Rs. 5 Million + fund transferred to beneficiaries and facilitated 2,500 units (in 6 months)
- Ripple effect seen in other villages and awareness and need of sanitation increased
- Integration of Drinking Water, Sanitation & Hygiene (WASH) approach helped in improving health of communities – especially women and children – uniqueness of the approach

Opportunity of institutional and programmatic convergence – i.e. NREGA, etc. being managed by single agency within the Government

Water Resource Management

Sustainability of drinking water is a critical issue in any community-managed drinking water project. Coastal villages are vulnerable and prone to salinity ingress resulting into deterioration of drinking water sources. Groundwater plays a key role in provision of safe drinking water to rural populations in coastal area villages. Development of local water resources holds special significance in coastal areas which was an integrated part of the project. Sometimes, when piped water supply is inadequate then people have to fall back upon tradition resources of water such as village ponds, tanks, dug wells and bore wells. Realizing this, local solutions which are in direct control of the community were increasingly being encouraged for better management of water resources and secure sustainability. In order to ensure sustainability of drinking water sources in CADP villages, water resource management work has been undertaken. They help recharge and strengthen local drinking water sources and ensure year around availability of drinking water.

The impact of WRM is seen across the village and across the population line. The figure below indicates substantial improvement in the ground water table and water quality.

Case Study: Tarp-lined lakes save rainwater in Bhal villages

Saline water is found at a depth of just eight feet in Dholera, Bhal region of Gujarat. Every year, ponds get filled up during rains but because of the seepage of the saline groundwater into the lakes, the water of these ponds cannot be used for drinking purposes. In fact, this water cannot even be consumed by cattle.

CSPC, with the help of the farmers, undertook a project under which the walls of a lake in Rajpur village as well as the lakebed were lined with tarpaulin. Even the lake's banks were covered with tarpaulin. Further, sand was placed on the tarpaulin covering the lakebed and on its bank, the tarpaulin was covered with cement and bricks.

Gobar Bhima, resident of Rajpur village and member of the village water committee, said that earlier the village had a water crisis and had to depend on tankers for drinking water brought in from outside. Sometimes, the villagers had to go to places far away to get drinking water. However, the problem was solved after the village pond was lined with tarpaulin. The pond has a capacity of nearly three crore litres of water which is enough to meet the drinking water needs of the village for the entire year. Villagers have also invested in fencing the pond.

Mansukh Solanki of the same village said there is no caste discrimination in allowing access to the lake water. Each resident is allowed to collect water according to his needs. The village also has a separate pond whose water is used for washing clothes and cleaning utensils.

Not just Rajpur village but another hamlet, Jhanki, has got a pond lined with tarpaulin. Residents of the village said that these ponds are constructed in such a way that there is no encroachment around them. Devrajbhai Bariya, a resident of Jhanki, said that villagers take care that the flow of rainwater into the lake is never obstructed. The villagers have also constructed a small well to ensure that villagers do not put their utensils directly into the tarpaulin-lined pond and thereby pollute its water.

These initiatives are a ray of hope for people in the salinity affected villages, and have considerably improved their living conditions.

Case Study: Rainwater harvesting empowering poor Bhal villagers

Water conservation programmes make locals self-sufficient in their drinking water needs. CSPC supports all the sections of society but focuses more on socially and economically backward people.

Not a raindrop that lands on a rooftop in Dholera is wasted - it is harvested and channeled into tanks. If these underground tanks are full, residents fill up other smaller tanks to take care of their domestic water needs for the year. Savitaben Vasani of Khund village says "We have an underground water tank which stores 10,000 litres. This year, with the good rains, the tanks were filled early and so we fill up big barrels, which are normally used for diesel storage." She says the harvested water is enough for her day-to-day needs for drinking and other domestic use.

Karni Sartanbhai, also a resident of Khund says, "Our village has Narmada river's water supply but this is inadequate and irregular. Villagers use these underground water tanks to meet their drinking water needs." She said the water is filtered using nets, and water from rooftops is channeled to the tank using pipes. We allow the first five minutes of water to flow away so the roof gets washed and the dirt doesn't enter the tank".

Ramaji Chauhan, a resident of Valindra village, says, "Water in the tank is allowed to settle for three or four days and after the rainy season the tank is kept closed. A hand pump is installed on the tank which means we don't need to put a vessel in to draw water." He said that they earlier had to depend heavily on water tankers or the women would have to go far away to fetch water. "These tanks have solved our drinking water problems", says Ramaji Chauhan.

Water Quality Monitoring

Salinity is a major cause of concern in coastal villages and in absence of any alternative safe source of drinking water; the communities have to consume saline water which leads to health issues mainly kidney stone and skin diseases. Some studies indicates that a household spends around Rs. 8,000 to Rs. 10,000/ year on health mitigation, especially on salinity related problems. The rural communities are not aware about the quality of saline water and hence can't make informed choice of source from where they need to collect water, even though safe water sources are available within a village. In view of creating awareness of safe drinking water, its impact on human health and educate rural communities in a scientific manner; 'Mini Water Quality Laboratories' were established at 4 different project locations. Other objectives were:

- To create institutional interface for community-centric service delivery mechanism for water quality monitoring & surveillance
- To create awareness among the water users and educate them about remedial and preventive measures
- To keep a check on the quality of water and advocate with relevant stakeholders (users and suppliers)

These laboratories were linked with the District level Laboratory established at Sayla, District: Surendranagar for providing backstopping support. Further, to integrate this water quality programme with state and district level, water quality reports were shared with District as well as State level laboratories.

Process

- These water quality laboratories test chemical and bacteriological tests with advanced but easy to operate equipments;
- All parameter testing method developed for easy to operate and also take care of results supremacy

- One person (undergraduate) trained for running the laboratory – technical backstopping by high-tech laboratory (10% samples cross verified at central lab)
- Quarterly data collection of all drinking water sources (One lab caters to around 100 villages)
- Based on the findings of the data; trainings organized for Water Committee members, Women's group, school children for preventive & curative measures at community / household level
- Advocacy with the Government for long-term curative measures

These laboratories have tested more than 3,000 samples and informed the community about quality of their sources. Further, the results were displayed in public domain at village level so all members of the community understands it and preventive measures.

LEARNINGS AND IMPACT

The project provided an innovative model of Public Private Partnership, where the resources from Government's existing programmes are leveraged with non-government funding partners joining hands to provide holistic solutions to rural communities to have access to safe water and improved habitat, which helps in improving health and overall livelihoods. More importantly, the rural communities are at the focal point of the project implementation and are the important stakeholders of this initiative. This collaboration of multiple agencies through complementary efforts helped in achieving integrated development of villages through establishing sustainable institutional mechanisms to achieve drinking water safety and security and improved habitat in coastal villages. This novel model would also set an example of creating synergy and building partnerships between the governments, national and international funding agencies, civil society organization and the rural community to attain a common objective of bringing efforts and resources together to have manifold impact. Few of the key impacts achieved are summarized below:

- Most of the villages are provided with tap connectivity within house premises and data shows that average coverage of tap connectivity is around 73% of all households, thus ensuring water at their doorstep.
- Time spent by women in fetching water has been reduced from 60 to 90 minutes to less than 30 minutes.
- Regular availability of water, with around 75% of households getting water daily and 18% getting water supply on alternate days; besides, setting up of distribution systems have helped in expediting acceptance of sanitation and improved personal hygiene practices among rural communities, especially women members.
- Over 85% of the families constructing a toilet have also constructed a bathing unit and all the sanitation units are functional; further, all families that have adopted household sanitation units have discontinued open defecation.
- Health and Hygiene improvement (78% of the households ranked it as their first priority) is the most prominent motivational factor for construction of toilets among the families of project area, followed by safety and protection (60%), and privacy & dignity concerns (57%). Subsidy for construction also plays a major role in decision to construct the toilet, which is acknowledged by over 50% of respondents.
- Around 60% of the households found reduction in vector menace in the village and neighborhood due to reduction in open defecation.

Based on primary data of 116 villages collected from ISAs

Key learnings

- It has also been learnt that due to availability of water at household level, sanitation coverage has picked up a pace and adoption rate is high with the availability of water.
- Sharing of cost by the community brings involvement of whole community including their timely interference against any wrong done in the village scheme work.
- Making fuller use of skill and water wisdom of the community, which ensures water supply with equal pressure.
- Sustained supply of water is a self-controlled water budgeting method whereby every household is conscious of water wastage. However, there is a need to continuously monitor and review the source of drinking water (be it local source or piped water supply) as most of the coastal villages are dependent on piped water supply sources.
- Women are the best ambassador for both water and sanitation. Hence investment in capacity building of women in production and maintenance of water sources has paid rich dividend.

Beyond learnings

Building Roof Rain Water Harvesting Structures (RRWHS)

With a view to provide drinking water security to individual families located in the remote areas, and for those who either do not have or limited access to any other reliable drinking water sources; such families are provided with roof-top rainwater harvesting structures. Roof-top Rain Water Harvesting Structure enables households to manage their own water supply for drinking water in coastal areas. It thus reduces the dependence on external sources of water and also enables storage of rain water for household purposes. These structures help to tackle the increased salinity in groundwater.

The identification of beneficiaries for RRWHS in a village is carried out during the baseline survey of the village and preparation of Village Action Plan, and the same is approved by the Gram Sabha. 391 RRWHS have been raised in 26 coastal villages spread across 3 districts of Gujarat.

Partners

- Ambuja Cement Foundation (ACF)
- Aga Khan Rural Support Program-India (AKRSPI)
- Mahiti
- Vivekananda Research and Training Institute (VRTI)

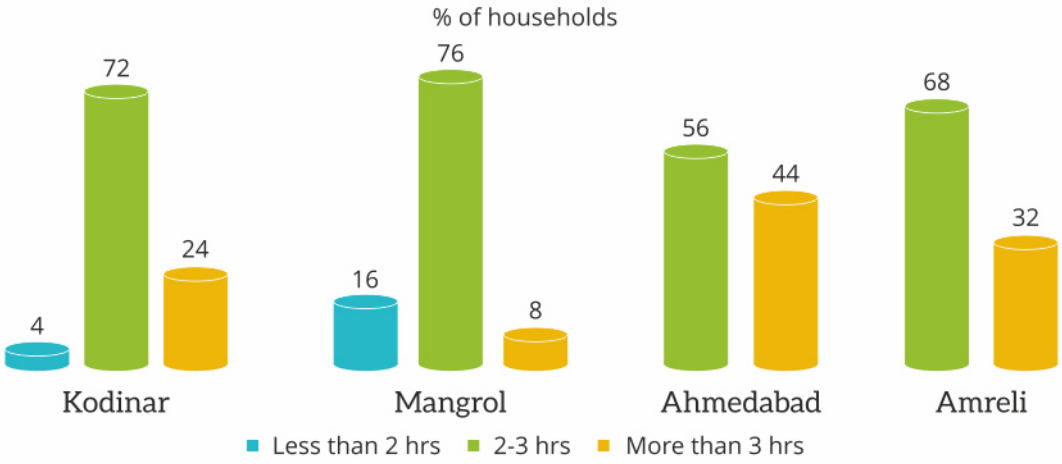
Coverage

District	No of Villages	No. of RRWHS
Junagadh	12	197
Ahmedabad	6	99
Amreli	8	95
Total	**26**	**391**

Impact

- Through RRWHS, storage of rainwater provides seasonal security and conservation of water resources.
- Reduction in time and money spent for collection of water for drinking and domestic use. In Dholera and Rajula before the construction of the RRWHS, a large percentage of households had to make more than 3 trips a day for collecting water for drinking and domestic use. Average cost of water collection was approximately Rs. 200/- per day per household.

Time spent on water collection in a day



- Availability of multiple sources of water supply through technological options
- Increased integrated community involvement and management
- Reduction in the incidence of water-borne disease due to improved quality of water
- Improvement in school attendance levels, especially of girls, earlier involved in collection of water
- 82% of sample households reported change in social status post the installation of RRWHS
- 100 % of sample households across all locations perceived water quality to be good with not even a single sample household reporting poor quality water.

03

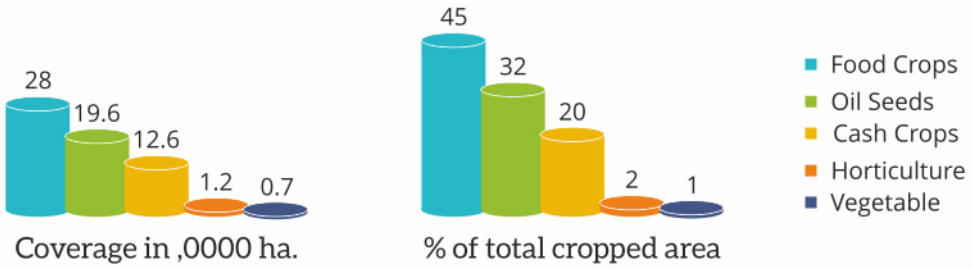
Promotion of Sustainable and Remunerative Farming and Natural Resource Management Practices

Background

Agriculture plays a significant role in the overall socioeconomic fabric of India, however, it is mostly dependent on monsoons in our country. Nearly, 64-70 % of the total cultivated areas are rain fed and therefore the fate of agriculture fluctuates with the change in monsoon patterns. Irrigation of cultivable land is of prime concern to the agrarian economy, especially if it is in the saline affected areas in Gujarat. The problem of poor water quality is aggravated due to shallow soil depth. Although the soil is of the coastal alluvial type, its depth is only 9 to 24 inches. The water holding capacity of the soil is poor, which eventually increases the number of irrigation systems required for any crop and adds up to the costs, time and above all, increased soil salinity.

The village level baseline carried out in 2007 for 1,165 coastal villages states that nearly 9 lakh Ha (Hectare) land is agriculture land out of which 3.40 lakh Ha has irrigation facility. The overall agriculture of the coastal area is cash crop agriculture with nearly 55% of the cropped area under cash crop. As shown in the graph below drawn from the baseline information of 977 villages the food-grain crops (45%) dominate overall cropped area. The area under the food grain crop is higher in rainfed areas including coastal villages of Kutch and Jamnagar district. The oil seeds (32%) crops and cash crops (20%) cultivation is increasing over time. The horticulture and vegetable crops coverage is negligible to an extent of 2 %. There are 248,000 farmers including 35% large land holders and 65% belong to small and marginal land holding categories.

Major crops coverage and its percentage to total area under cultivation



(Source: Baseline study of 977 coastal villages covering Saurashtra & Kutch)

The increasing cropping area of genetically modified crops like Bt. Cotton is posing a major concern about the spurious seeds, increasing pest in the fields and use of inferior irrigation water leading to degradation of soils. The replacement of groundnut by cotton is also resulting in shortage of green fodder for animals available from groundnut foliage. As a result, the farmers are avoiding milch animal rearing. As a consequence of reduction in animals, the farm yard manure availability and price is going beyond farmer affordability.

Approach

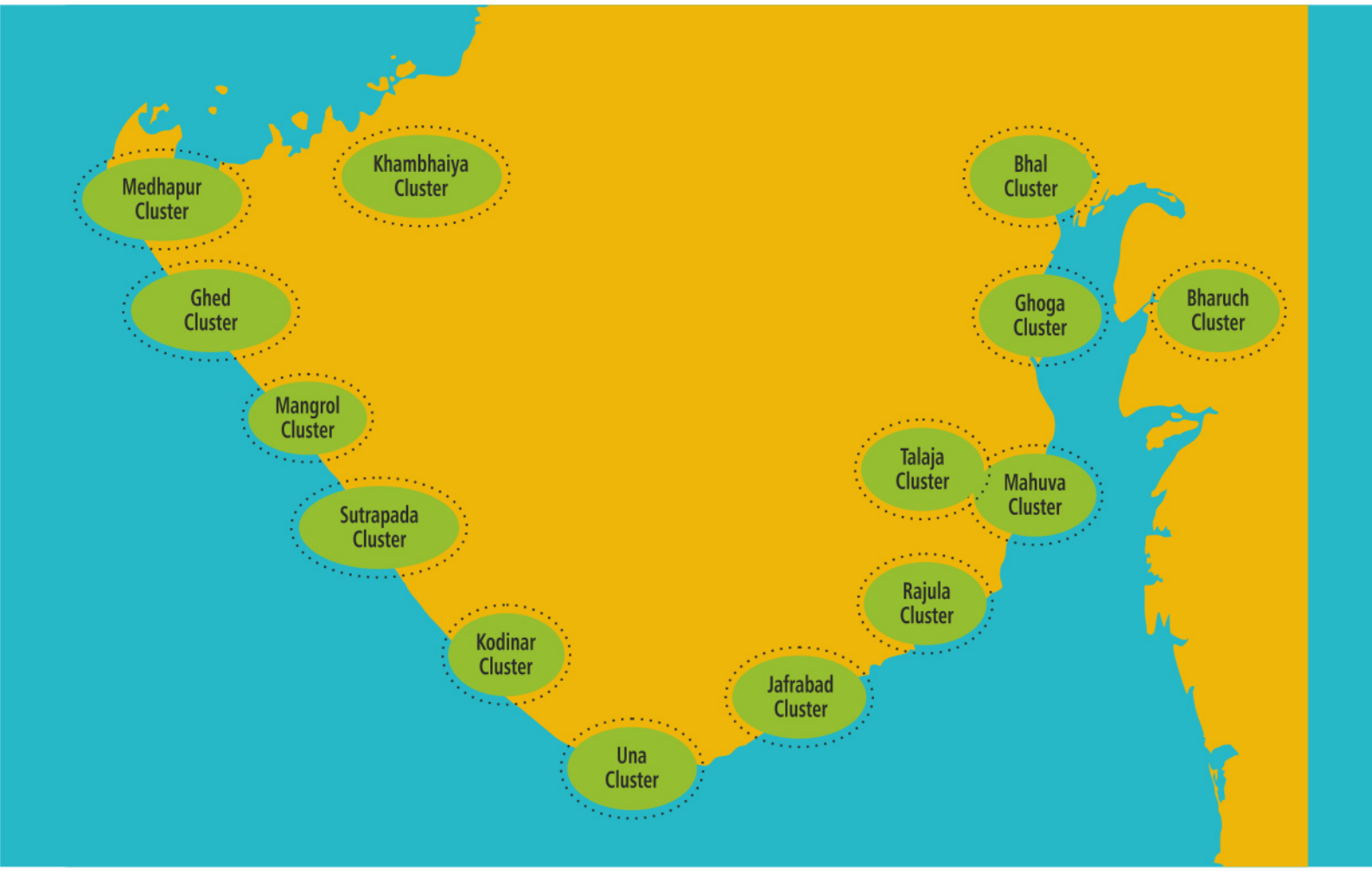
CSPC has been focusing on promoting ground water recharge by supporting various natural resource management activities.

Demand management of water for agriculture and improved farming practices is critical to sustain livelihoods of the communities in the region. Keeping this in mind, the overall approach of CSPC has gradually shifted to integration of Natural Resource Management (NRM) with promotion of sustainable agriculture in saline conditions. The key objectives set for the programme were:

- Intensive focus on Integrated Pest management (IPM) of key crops during Kharif and Rabi season
- Promotion of salinity resistant and low water intensive crops
- Promotion of agriculture technology like Micro Irrigation Systems, Mulching etc
- Strengthening extension services through trainings, capacity building of Krishi Sevak, establishment of
- Agriculture Clinic Centres and its linkages with various district based institutes, etc.

CSPC and its partner organizations started working towards developing agriculture interventions, covering 201 villages in 11 clusters across 7 coastal districts of Gujarat.

Various interventions were taken up in 17 clusters formed with 209 villages in 6 districts (as highlighted in the map).



The overall implementation strategy of CSPC has focused on addressing long term sustainability of rural on-farm based livelihoods by piloting innovative models and approaches of agriculture diversification, promotion of horticulture, water saving crop species, salt tolerant crops such as safflower, sugar beet, date palm plantations, etc. in coastal areas. The pilot interventions have helped in establishing the feasibility of such innovative practices in the salinity affected areas.

Progress

Under agriculture interventions; more than 14,000 farmers have been covered across eight districts through direct and indirect coverage.

Districts	Blocks	Crop Demonstrations												
		Kharif season				Rabi season					Vegetable	Fodder	Kitchen Garden	Total
		Cotton	Groundnut	Others	Total	Wheat	Gram	Cumin	Others	Total				
Bharuch	Jambusar	19	NA	17	36	20	5	1	4	30	4	22	0	92
Ahmedabad	Dhanduka	2	0	0	2	0	0	4	0	4	1	5	150	162
Junagadh, Porbandar & Devbhoomi Dwarka	Mangrol, Madhavpur, Kalyanpur	10	50	0	60	25	15	10	0	50	0	25	0	135
Gir Somnath	Kodinar, Sutrapada, Gir Somnath	30	48	20	98	30	0	0	0	30	0	0	0	128
Gir Somnath	Sutrapada	25	0	5	30	15	0	0	6	21	0	24	0	75
Gir Somnath Amreli	Veraval, Jaffrabad	50	25	0	75	18	0	0	3	21	0	1	0	97
Jamnagar	Okhamandal	1	1	4	6	6	4	0	0	10	1	1	0	18
Amreli, Bhavnagar	Amreli, Bhavnagar	15	6	0	21	12	0	3	5	20	2	2	0	45
Total		**152**	**130**	**46**	**328**	**126**	**24**	**18**	**18**	**186**	**8**	**80**	**150**	**752**

Indirect coverage

Name of Partner Organisation	AATAPI	AKRSPI	GHCLFT	KVKJ-ACF	MAHITI	SSKK	TCSRD	VRTI	**Total**
Nos. of farmers covered through Extension services	1356	2942	427	3722	181	3213	279	1064	**13184**

Impact

The outcomes and impact observed are as follows:

- More than 18,150 farmers have been covered through provision of technical and advisory services on improved farming practices on key crops such as cotton, groundnut and wheat.
- With the introduction of low cost technical innovation such as Pheromone Trap in 400 acres of Groundnut crop in Gir Somnath and Junagadh districts, an increase in profit of farmers by Rs. 3,884/- per acre against an investment of Rs. 96/- per acre has been observed. Pheromone Trap reduced utilization of pesticides by 8%.
- The saline resistance and low water intensive wheat varieties i.e. KRL 19 introduced in the salinity affected areas resulted in an increase in the production by 40-60% as compared to the local variety grown in the same area. Reduction of water usage for wheat cultivation by 30% with the introduction of new low-water intensive wheat varieties such as KRL-19 and KRL-210.
- Around 12% increase in production and more than 10% reduction in input cost for groundnut in Junagadh and Jamnagar districts.
- More than 10% reduction in input cost and 20% increase in yield of hybrid cotton in Amreli and Bhavnagar districts.
- Upto 50% increase in yield of GCot 25 Cotton (Desi Cotton variety) in Jambusar block of Bharuch district
- The kitchen gardening activity was initiated with 50 members of SHG in Dholera area during 2012-13 to ensure the nutrition availability at family level whereas during 2013-14, the activity has been adopted by more than 200 SHGs members of the area at their own costs with only technical support by the CSPC. Introduction of kitchen gardens with small and marginal farmers has provided additional income of Rs. 20,000 / family / year.
- Milk production increased by 25% with sugar beet fodder (high-salinity tolerant crop) and an additional income of Rs 4,725 was realized over 45 days from cultivation of sugar beet across 0.1 acre. Introduction of sugar beet as fodder nutrient supplement for cattle has received encouraging response as it grows in high saline water and also helps in improving the quality of milk.
- Promotion of crop protective measures like installation of Solar group wire fencing to reduce economic losses due to damage of crops by animals. A total of 31 farmers in 9 groups protected their farms of around 197 acres of land from animal attacks through solar group wire fencing.
- Mobile messages as a means to extend agriculture extension services, mobile messages were sent to the farmers, containing information on critical stages of the crops covering the information on diseases, pests and their management to the farmers over phone in the form of voice which is titled as “AAVAJ OTLO”. This was done with the facilitation support of Sajjata Sangh. The technology has benefitted more than 2,500 farmers were registered.

Case Study: Kitchen Gardens: Anti-inflation paradise

Kitchen gardens have become a rage not only in Gujarat's cities, but also in its villages, particularly those located around Ahmedabad city. For the past couple of years, Jaysangbhai Solanki of Valindhra has been growing vegetables in his backyard. This year he successfully grew onions. He is not bothered about onions becoming expensive. Now he is able to barter onions for other vegetables thanks to the kitchen garden in his backyard.

Bhavnaben and her mother Savitaben collect rain water in tanks so that they have water for their kitchen garden even after the monsoon ends. Vasanis are a family of six adults. They get about 1.5 kg. of okra every alternate day and nearly 2 kg. of bottle gourd every three to four days. Bhavnaben says that “earlier my mother used to buy vegetables only on festivals or when guests dropped by. But now we eat vegetables daily. According to Savitaben, chemical fertilizers are not used for the garden. They use manure, and insecticides are only used if it is required.

Karniben has been promoting the idea of the kitchen garden, especially among pregnant women in her village. Karniben, who is a health worker, had harvested 5 kg. of bottle gourd which she distributed among pregnant women free of charge. There is a big pit near her residence which fills up with rainwater during the monsoon. She uses that water for her kitchen garden, where she grows brinjal, tomato and okra.

Laxmiben found a new method for cultivating her kitchen garden. Instead of sowing seeds directly in the ground, they use gunny sacks. These bags are spread in the backyard and seeds sown. This has proved to provide a good yield with less water. Laxmiben lives in a joint family of 10 members. The kitchen garden has ensured that the family gets one serving of fresh vegetables daily. Her grand daughter, Tina, who is deaf and dumb loves ridge gourds (turiya) and she gets turiya on alternate days.

At eight in the morning, 80 year old Shantaben is up and about working in the vegetable garden outside her home.“ “Once a year I go on a religious tour and don't want to take a penny from my son. So I continue maintaining the kitchen garden.” says Shantaben. There is a large plot near her residence, which has been unused for years. For two years now, with help from Coastal Salinity Prevention Cell and Mahiti, she's been growing vegetables. In no time, she was giving away extra vegetables to her neighbours. She later decided to sell the extra vegetables. The business which began with a small turnover is growing and she now earns about Rs. 500 a day. Pointing at her ridge gourds (turiya) and bottle gourds (dudhi) she proudly asks, “Do you get this quality in your city or malls? One ridge gourd in my garden weighs about 500 to 1000 gm while in the cities, its just 200 gms”. She says she's learnt how to develop a kitchen garden and now ensures that women in her village are trained on having a kitchen garden.

Natural Resources Management

The key strength of CPSC is natural resource management and since inception, CSPC has put intensive efforts on development of Water harvesting structures and has created number of structure across coastal in partnership with local partner organizations. Along with this, CSPC has planned to work on participatory irrigation management on bandharas for which the studies has been taken up and its implementation plan is under way. In this regards, the programmes based on NRM are illustrated below:

- A pilot project on various low cost water harvesting structures like farms ponds, drip irrigation systems and Micro Irrigation Systems (MIS) was taken up in Dholera Area of Ahmedabad and implemented by MAHITI organization. A Technical study conducted to gauge the feasibility and willingness of beneficiaries was undertaken and then, 7 farm ponds were constructed and renovated along with installation of 7 Drip irrigation was carried out.

- Under promotion of water use efficiency measures, around 6,000 famers have been covered through direct technical and part financial support. Promotion of Drip Irrigation Systems helped in reducing the consumption of irrigation water by 70% (target was 30%), resulting in power savings to the tune of 50%. Due to usage of Sprinkler Irrigation Systems, groundnut and summer crop production increased by 20% and 50%, respectively, resulting in increased income of Rs. 7,500/- acre/year.

- In order to use the stored water effectively, a pilot project on MIS based lift irrigation was undertaken in Kotadi village of Rajula taluka, in partnership with Vivekanand Research and Training Institute (VRTI). The technical feasibility of the Dhatarwadi dam was conducted and it was found that there are possibilities of increasing the irrigation capacity, potential for recharge through localized water management interventions and adoption of integrated agricultural activities. This project -Dhatarwadi irrigation project-2 comes under the Government's medium size irrigation dam for which approval for irrigation to 205 ha of land of 109 farmers was received.

- A detailed analysis of the structures was undertaken by CSPC, which shows that the structures could irrigate 285 acres of land which includes 150 acres in Kharif and 135 acres in Rabi season. The integration of MIS could be done in 150 acres of land for which the services towards designing and detailed layout plan would be taken up with the MIS suppliers already working in the areas. Overall, it was planned to cover around 100 farmers under the project. The farmers have registered a cooperative in the name of "Radhekrishna Cooperative Irrigation Management". The lifting permissions and approvals for pump house location were taken.

Participatory Irrigation Management (PIM)

Based on the recommendation of HLC Kapoor Committee, quite a number of bandharas were constructed across the coastal villages of Gujarat, in the past. Out of those structures, 22 structures have been studied by CSPC to understand the potential and current usage of those structures. The study highlighted that the water harvested due to the structures was not being utilized to its full capacity and on the other hand, some of the farmers who have their land around the structures are the only ones reaping benefits of those structures. According to the state irrigation department, the water usage charges have also not been paid fully by the community due to such institutional issues. Hence, it was noted that PIM needs to be implemented in all the structures which would be helpful in regularizing the water usage and will help the deprived farmers to get the irrigation water.

Integrated Salinity Mitigation Initiative - Farm Ponds

Farm pond is among the best alternatives for conservation and harvesting of rain water, especially in salinity affected coastal villages. Farm pond harvests rainwater and stores it for future use. Farm bunds are constructed on agricultural land, along the boundary of the field with an aim to prevent soil erosion and improve the soil moisture. The farm bunds are divided into three types on the basis of the slope of the land and size of field. It helps to conserve water in the field and maintain in situ moisture in the field.

Based on the experiences and learnings of pilot interventions, a project in partnership with Gujarat Ecology Commission (GEC) was implemented in Gaga village with a saturation approach. More than 40 farmers were covered with farm pond intervention whereas more than 200 acre land was covered with farm bund interventions.

Case Study : Farm Pond - A boon to agriculture

Parbatbhai got a farm pond constructed on his land in the month of April 2013, with the support of AKRSPI. The structure measures 2.5 x 40 x 40 cubic meter and has a storage capacity of nearly 4 million litres of water once. Parbatbhai has a landholding of 15 Bigha. He was able to grow jowar and bajra, which requires less water on this piece of land.

He is very positive, enterprising and keen to optimize the land usage, so as to enhance the productivity of his land. He had always dreamt of and aspired to construct water harvesting structures to conserve the rain water and make full use of the same during difficult days. His idea has been able to see the light of the day, when he constructed farm pond, firstly with GSLDC and then with the help of GEC. The construction of the farm ponds has had a huge impact in the life of Parbatbhai. His ability to provide support irrigation has increased.

Earlier too, Parbatbhai used to grow jowar and bajra, however his net income from both the crops merely amounted to 20550 INR. Now, he is growing cotton and bajra and able to secure a net income of INR 144612.5. As a result of his increase in income, Parbatbhai has already planned to purchase wheat flour machine, which costs around 9000 INR and also for insurance, in addition to his contribution towards the marriages in the family.

Parbatbhai has decided to share this piece of information with the other villagers, so that they could also bring a change in their lives, and obviously a change in their villages.

Due to this intervention, it was observed that around 22 farmers who were cultivating only Kharif crops and a small size of land under Rabi cropping; now able to irrigate 127 bighas of land during Rabi season for the first time. The total income from the crop was estimated at Rs. 9.12 lakh. i.e. an additional income of Rs. 7158/bigha. Additionally, 52 bighas of land were brought under summer cropping. Farmers also revealed that the beneficiary group stopped using their 30 wells for irrigation and have switched to lift irrigation. As a result there has been an increase in water availability in surrounding wells allowing them to irrigate their land during Rabi season.

Overall impact of Programmes

Water Resource Development

- More than 65% of the farmers provided protective irrigation to their Kharif crops; thereby, earning additional income of Rs. 25,000/- per year
- Due to improved water availability, 50% of land area was diversified to grow new varieties of crops such as cumin and coriander, enhancing income by up to 45%, compared to traditional crops
- There has been a 35% increase in the area under Rabi cultivation (target was 25%) with the availability of irrigation through farm ponds, check dams, etc.
- Increase in milk production by 40-50% due to availability of green fodder throughout the year
- There has been substantial improvement in the water quality; the Total Dissolved Solids (TDS) of water has decreased from 6,000 parts per million (PPM) to below 2,000 PPM
- The water table has risen by up to 8 feet through water recharging interventions
- Water conserved through runoff checks (farm bunds) resulted in increase of yield of wheat, groundnut and summer crops to the tune of 25%, 100% and 30% respectively.

04
Other Projects

Assessment of Schemes for Flood management and creek mouth closure in the Ghed region of Saurashtra

Coastal Salinity Prevention Cell conducted a study on the flood situation and saltwater intrusion in the Sorti Ghed area near Porbandar, based on the on-site visits and review of available secondary data. This study was conducted to develop schemes to control flooding and saltwater intrusion and resolve the water resources problems in the area. The objective of the study (Phase I) was to collect, consolidate information on the past interventions on water management and assess the effectiveness of such schemes based on the available data, site visits and dialogue with the communities. This study was successfully completed and helped in understanding the existing flood water management in the Sorti Ghed area. Phase II of the study has to be conducted in near future to design solutions for flood management using field measurements to calibrate and apply mathematical models for both Sorti and Barda Ghed areas.

The problems in Sorti Ghed occur largely due to attempts to balance the two problems of saline water ingress and flooding. Resolution of this conflicting issue needs to consider the overall water demand, the riparian issues along the rivers, the highly varied monsoon flows, the complex coastal sediment transport, the numerous engineering options and finally, the social requirements of the inhabitants.

The issue of sandbar formation was studied to design a low maintenance permanent opening and this will be amalgamated into the model. For the first time, there will be an integration of social and educational measures with technical measures to ensure that the philosophy behind the measures is fully understood by all the stakeholders.

Findings of the study

- The study of Phase I highlighted that the Phase II study be implemented based upon the findings of the Phase I study. This study would provide a detailed hydraulic model of the watercourses, existing schemes and planned interventions in the area. Surveys by Salinity Ingress Prevention Circle for bathymetry in the Navibandar backwaters and topographical surveys of irrigation canals and rivers cross-sections will be key requirements for the Phase II study.
- Mathematical flow model for the flood plain would provide improved cost benefit to the Department. The mathematical model can also be used by managers during operations with the addition of flood forecasting capabilities at a later date. Stakeholder involvement in planning can be increased.
- The Sorti Ghed basin is flooded for 20 to 100 days during the monsoon. The tidal regulators on the Ozat and Madhuvanti rivers, that aim to prevent/regulate the entry of seawater, are weir structures that do not provide flexibility to reduce or increase discharge by the SIPC staff. Gated structures would provide greater flexibility in the elevation of flood levels and period of flooding. The sill level and sizing of the gated structure need to be determined through a detailed mathematical model study.
- The sand bar at Navibandar limits the flow of floodwaters to sea, building up the water levels in the estuary/backwaters. The area between the tidal regulators and the sandbar has saline waters due to percolation through the sandbar. When water levels rises above the height of the tidal regulators, the mixed brackish water flows back into the Ghed basin; thus, opening the mouth “permanently” by preventing the sandbar formation is a key requirement of the area. The design of the mouth opening with training jetties need to consider tide, wave and coastal currents in order to ensure that adverse shoreline changes do not occur.

- The rainfall statistics indicate high inter-annual and daily rainfall variability and so the design has to consider this 'variability'. During operations, the modern day improvement in climate weather predictions can be used by local managers, provided greater control is available. The model will provide an understanding of the response of the flood plain to inflow-outflow characteristics.
- Education of the local stakeholders is a key requirement in the area including holistic understanding of the catchment area, water demand, groundwater utilization, cropping pattern, etc, which becomes vital to manage the issues of saline water intrusion. Illustration of the model outputs using GIS would also enhance the understanding of the situation.

It is understood that a dynamic model of river flow linked with rainfall and tidal conditions will enable engineers in the department make informed decisions regarding the following:

- Design of various capital measures to ensure that they have the desired effect at various flow conditions
- Discarding interventions which will not have a positive effect on the catchment at an early stage before funds are spent
- Ability to operate the flow system in a dynamic manner which responds to observed rainfall

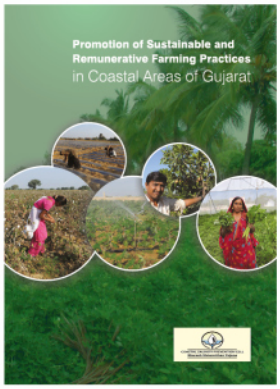
Having an easy to use, sophisticated and powerful system will optimize investment in water resources schemes in the area.

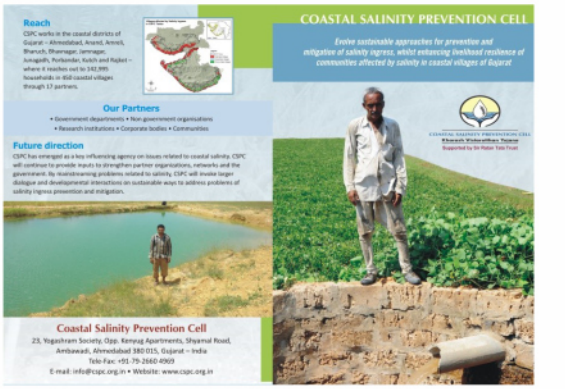
Socio-economic impact assessment study of salinity prevention structures

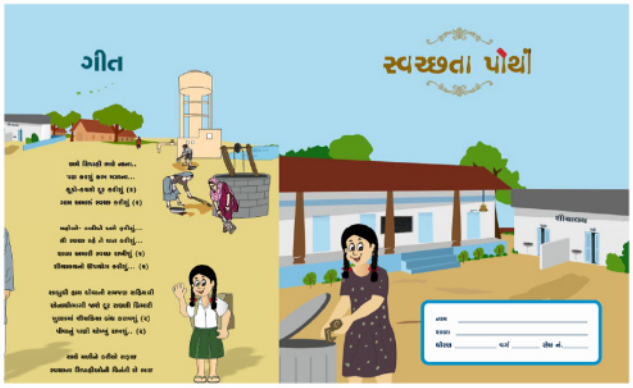
CSPC conducted a socio-economic impact assessment study of salinity prevention structures (tidal regulators, bandharas, check dams, reservoirs, etc) constructed by the Salinity Ingress Prevention Circle (SIPC) for improving the water quality and availability of coastal aquifers. The main aim of the study was to assess the socio-economic impact of these structures on the community and provide recommendations for strengthening its impact. The study covered around 100 villages spread across 21 structures in 5 districts, viz Amreli, Bhavnagar, Jamnagar, Junagadh and Porbandar. Dialogue was carried out with the villagers by the survey team of CSPC to assess the socio-economic impact of these structures. The final report incorporating the suggestions and feedback of SIPC is under the development stage. Apart from the study, the project also included case studies highlighting the benefits of the construction raised by the state government on the community. These case studies reflected upon the changes that ushered in the lives of villagers. The ground water recharge level improvement in the region; water relatively became less saline than earlier condition, and hence used for drinking and irrigation purposes. Crops became less dependent on rain water for agriculture. Farmers widened their scope of agriculture from mono crop pattern to growing diverse vegetables and cash crops in different seasons.

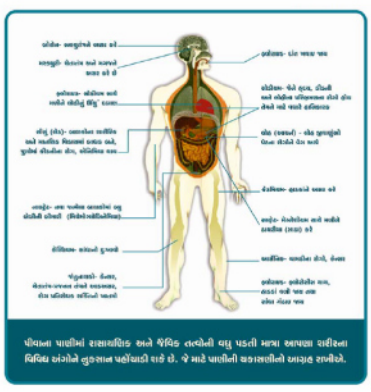
Information, Education & Communication, IEC

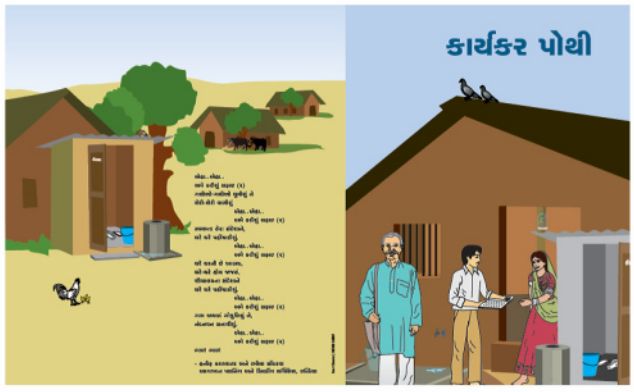
Information, Education and Communication are important components of development programme, which act as a means of promoting desired, positive behaviours in the community. It has the potential to accelerate the process of change and hasten the process of adoption amongst the community. IEC have clear objectives to achieve for specific target audience, addressing specific problems, within a desired set of time frame. CSPC has developed posters, brochures, booklets, messages for drinking water and sanitation, agriculture and natural resource management to disseminate messages for field interventions, trainings and publicity.











CSPC Website

Our website www.cspc.org.in is a resource center on topics like Study on Impact Salinity on Health in Coastal Gujarat, Geohydrology information on Coastal Gujarat among others. The website also has case studies and in depth information on Drinking water & sanitation, NRM & Agriculture development and Non Farm based livelihood. Also there are photos and videos on our projects and their impact.

05
Way Forward

By one estimate, half the world's population now lives in coastal areas, 10% live in low-lying areas particularly vulnerable to sea-level rise caused by global climate change, and the numbers are expected to continue growing. Their economies and lives depend on finding effective ways to adapt to sea-level rise, more severe storms, flooding and the loss of crops as salt water invades croplands.

Keeping in view the learnings, the vision and strategic objective of the initiative is to consolidate the experiences and the outputs of the programme interventions so far. The overall approach of the initiative would be guided by the strategic planning of 2020 with a major focus on reducing the impact of salinity in around 550 coastal villages (~ 33% of the total coastal villages of Saurashtra) of Gujarat. The project aims at;

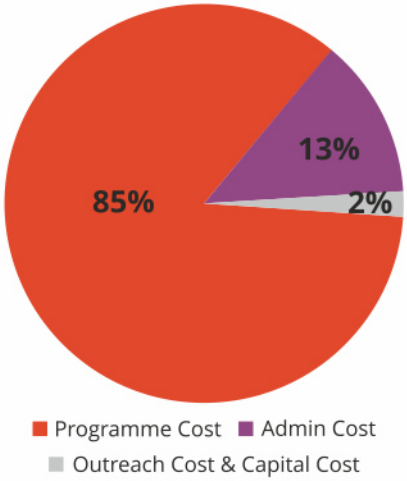
- To reduce the rated of degradation of agriculture and public land and where practical recover, rehabilitate or manage salt-affected land;
- To protect and restore water resources to ensure salinity levels are kept to a level that permits safe, potable water supplies to rural communities;
- To protect and restore high-value wetlands and natural vegetation, and maintain natural diversity;
- To provide communities with the capacity to address salinity issues and to manage changes brought about by salinity;
- To advocate that Salinity a National Issue and Concern - engagement with Government at national as well as state level. The need is to raise the level of debate on the issue, to draw attention and commitment of policy makers and practitioners; and
- To address second generation issues of providing alternate livelihood opportunities to rural youth by enhancing their skills and ensure quality education to children.

It has also been articulated that Coastal Salinity Prevention Cell (CSPC) as the nodal agency will have the following as the broad targets to be achieved:

- To expand the scope of engagement with State Government and enlist involvement of other relevant departments in the ongoing and future programs.
- To strengthen the ongoing project activities to expand the scale and scope in terms of increasing number of stakeholders from NGOs, CBOs and primary producers.
- To increase awareness about the issue and establish two-way channel of communication between people and policymakers and planners engaged with the salinity problem.
- To strengthen CSPC as an organisational instrument by building up its human resources and operational systems to carry out it's ascribed roles i.e. networking, facilitating and leveraging.

Expenditure 2013-14

Programme Cost	Capital Cost	Admin Cost	Outreach Cost	Total Cost
24458696	94030	3607310	513644	28673680

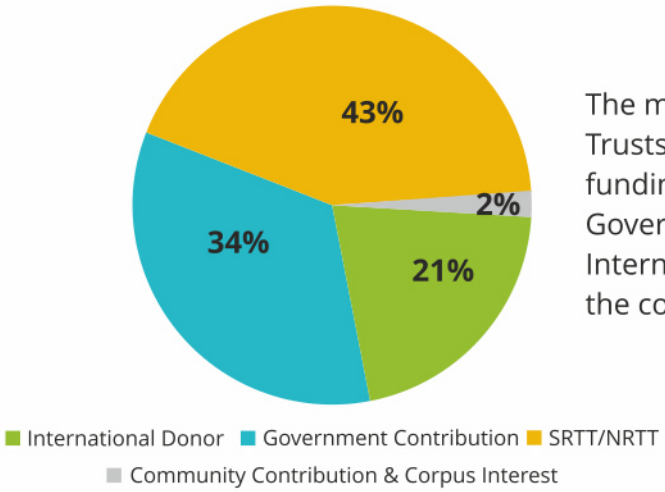


Our expenditure for the financial year 2013 was INR 28,673,680; out of which programme expenditure amounted to INR 24,458,696, capital expenditure of INR 94,030, administration expenditure of INR 3607310 and outreach expenditure of INR 513,644.

Donorwise contribution 2013-2014

International Donor*	Government Contribution	SRTT/ NRTT	Community Contribution	Corpus Interest	Total
6149216	9612770	12230790	531185	139456	28663417

**Conrad N. Hilton Foundation and Bill & Melinda Gates Foundation*



The major source of funding was from the Tata Trusts (SRTT/NRTT) of INR 12,230,790 followed by funding of INR 9,612,770 from the State Government followed by INR 6,149,216 from International donors and INR 531,185 raised from the community.

B J S & ASSOCIATES

CHARTERED ACCOUNTANTS

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INDEPENDENT AUDITOR'S REPORT

To,
The Members of,
COASTAL SALINITY PREVENTION CELL

Report on the Financial Statements

1. We have audited the accompanying financial statements of **COASTAL SALINITY PREVENTION CELL** which comprise the Revised Balance Sheet as at 31st March , 2014, the Revised Statement of income and Expenditure for the year then ended, and a summary of the significant accounting policies and other explanatory information.

Management's Responsibility for the Financial Statements

2. The Company's Management is responsible for the preparation of these financial statements that give a true and fair view of the financial position, financial performance of the Company in accordance with the Accounting Standards notified under the Companies Act, 1956 (the "Act") read with general circular 15/2013 dated September 13, 2013 of the Ministry of Corporate Affairs in respect of Section 133 of the Companies Act, 2013. This responsibility includes the design, implementation and maintenance of internal control relevant to the preparation and presentation of the financial statements that give a true and fair view and are free from material misstatement, whether due to fraud or error.

Auditors' Responsibility

3. Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with the Standards on Auditing issued by the Institute of Chartered Accountants of India. Those Standards require that we comply with the ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

4. An audit involves performing procedures to obtain audit evidence about the amounts and the disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers the internal control relevant to the Company's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of the accounting estimates made by the Management, as well as evaluating the overall presentation of the financial statements.

5. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

B J S & ASSOCIATES

CHARTERED ACCOUNTANTS

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6. In our opinion and to the best of our information and according to the explanations given to us, the financial statements give the information required by the Act in the manner so required and give a true and fair view in conformity with the accounting principles generally accepted in India:

(a) in the case of the Balance Sheet, of the state of affairs of the Company as at 31st March, 2014;

(b) in the case of the Statement of Income & Expenditure, of the Surplus of the Company for the year ended on that date, and

Report on Other Legal and Regulatory Requirements

7. As required by the Companies (Auditor's Report) Order, 2003("the Order") as amended by the Companies (Auditor's Report) (Amendment) Order , 2004 issued by the Central Government of India in terms of sub-section (4A) of section 227 of the Act (herein after referred to as the "Order"), and on the basis of such checks of the books and records of the Company as we considered appropriate and according to the information and explanations given to us, we give in the Annexure a statement on the matters specified in paragraphs 4 and 5 of the Order.

8. As required by Section 227(3) of the Companies Act 1956, we report that:

(a) We have obtained all the information and explanations which to the best of our knowledge and belief were necessary for the purposes of our audit.

(b) In our opinion, proper books of account as required by law have been kept by the Company so far as it appears from our examination of those books.

(c) The Balance Sheet, Statement of and Income and Expenditure Statement dealt with by this Report are in agreement with the books of account.

(d) In our opinion, the Balance Sheet, Statement of Income and Expenditure dealt with by this Report comply with the Accounting Standards notified under the Companies Act, 1956 read with the General Circular 15/2013 dated September 13, 2013 of the Ministry of Corporate Affairs in respect of Section 133 of the Companies Act, 2013.

(e) On the basis of the written representations received from the directors as on 31st March, 2014 and taken on record by the Board of Directors, none of the directors is disqualified as on 31st March, 2014 from being appointed as a director in terms of clause (g) of sub-section (1) of section 274 of the Act,.

For BJS And Associates
Chartered Accountants
Firm Registration No. 113268W

BJS & ASSOCIATES · C.A. · AHMEDABAD

(BIPIN J. Shah)
Partner
Membership No. 10712

Place : Ahmedabad
Date : 22-12-16

REVISED

COASTAL SALINITY PREVENTION CELL
(A COMPANY REGISTERED UNDER SECTION 25 OF THE COMPANIES ACT, 1956)
BALANCE SHEET AS AT 31.03.2014

	Particulars	Note No.	YEAR ENDED 31/03/2014		YEAR ENDED 31/03/2013	
I.	**EQUITY AND LIABILITIES**					
1	**Shareholders' funds**					
	(a) Share capital	1	6,00,000		6,00,000	-
	(b) Reserves and surplus	2	8,30,384		9,08,220	-
	(c) Money received against share warrants					
	Total (1)		-	14,30,384		15,08,220
2	**Share application money pending allotment**					
	Total (2)			-		-
3	**Non-current liabilities**					
	Total (3)			-		-
4	**Current liabilities**					
	(a) Short-term borrowings		-		-	-
	(b) Trade payables					
	(c) Other current liabilities	3	2,81,90,891		2,22,67,683	-
	(d) Short-term provisions	4	2,83,126		29,905	-
	Total (4)			2,84,74,017		2,22,97,588
	TOTAL(1+2+3+4)			2,99,04,401		2,38,05,808
II.	**ASSETS**					
	Non-current assets					
1	(a) Fixed assets	5	2,39,097		2,12,156	-
	(i) Tangible assets					
	(ii) Intangible assets					
	(iii) Capital work-in-progress					
	(iv)Intangible assets under development					
	(b) Non-current investments		-		-	
	(c) Deferred tax assets (net)					
	(d) Long-term loans and advances		-		-	
	(e) Other non-current assets		-		-	
	Total (1)			2,39,097		2,12,156
2	**Current assets**					
	(a) Cash and cash equivalents	6	2,46,60,214		1,91,52,745	
	(b) Short-term loans and advances	7	45,01,320		39,86,096	
	(c) Other current assets	8	5,03,770		4,54,811	
	Total (2)			2,96,65,304		2,35,93,652
	TOTAL (1+2)			2,99,04,401		2,38,05,808

[Notes to Accounts & Significant Accounting policy the Note No. 1 To 11 Form an integral part of these Financial Statement.]

For, BJS & Associates
Chartered Accountants
FRN:- 113268W

Bipin J. Shah
Partner
Membership No. 10712

Place: Ahmedabad
Date: 22/12/2014

For and on behalf of the Board

Divyang Waghela
Chief General Manager

Director

Apoorva Oza
Chairman

Director

Coastal Salinity Prevention Cell Ahmedabad

REVISED

COASTAL SALINITY PREVENTION CELL

(A COMPANY REGISTERED UNDER SECTION 25 OF THE COMPANIES ACT, 1956)

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31st MARCH 2014

	Particulars	Note No.	YEAR ENDED 31/03/2014		YEAR ENDED 31/03/2013	
I	**Revenue**					
(1)	Gross Interest on Investments, Short Term Deposits and Savings Bank Accounts		14,98,528		8,56,483	
	(Less) : Credit given to Funding Agency		13,68,022		6,54,784	
	Sub Total (A)			1,30,506		2,01,699
(2)	Contribution from Beneficiaries for Projects				2,26,966	
	Contribution received from Donar Agency		5,31,185		2,17,442	
(3)	Assistance / Grants received from Government / Donor Agencies for Programmes		1,76,14,154		96,82,345	
	Add : Interest Credited		13,68,022		6,54,784	
	Sub Total (B)			1,95,13,361		1,07,81,537
(4)	Donation Received					-
(5)	Data Collection Bandhara Study		-			99,000
(6)	Miscellaneous Income					-
I.	**Total Revenue**			1,96,43,867		1,10,82,236
II.	**Expenses:**					
	Cost of materials consumed			-		-
	Purchases of Stock-in-Trade					
	Changes in inventories of finished goods work-in-progress and Stock-in-Trade [decrease / (increase)]			-		-
	Employee benefits expense	9		18,01,584		12,81,306
	Finance costs					
	Program Expenditure	10	1,59,61,740		81,03,112	
	Operational Expenditure	10	17,50,036		11,87,277	
				1,77,11,776		92,90,389
	Depreciation and amortization expense-Corpus	11	14,780			17,094
	Other Mis. Expenditure-Corpus		13,869			
				28,649		
III.	**Total expenses**			1,95,42,009		1,05,88,789
IV.	**Surplus before exceptional and extraordinary items and tax (I-II)**			1,01,858		4,93,447
V.	**Exceptional items**			-		-
VI.	**Surplus before extraordinary items and tax (III - IV)**			1,01,858		4,93,447
VII.	**Extraordinary items**			-		-
VIII.	**Surplus before tax (V- VI)**			1,01,858		4,93,447
	Tax expense:			-		-
IX.	**Surplus (Deficit) for the period**			1,01,858		4,93,447

For, BJS & Associates
Chartered Accountants
FRN:- 113268W

Bipin J. Shah
Partner
Membership No. 10712

Place: Ahmedabad
Date: 22-12-2014

BJS & ASSOCIATES C.A. AHMEDABAD

For and on behalf of the Board

Divyang Waghela
Chief General Manager

Apoorva Oza
Chairman

Director

Director

Coastal Salinity Prevention Cell Ahmedabad

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Print : Satyam Print

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